

IN THE SPECIFICATION:

Please amend the specification as follows:

On page 3, please delete lines 2 thru 6, and add the following lines:

--Brief Description of the Drawings--

--Figure 1 is a block diagram of a computer network in accordance with a preferred embodiment of the present invention.

Figure 2 is a flow diagram which illustrates the major steps of a method in accordance with a preferred embodiment of the present invention.--

On page 3, please delete line 9 thru page 5, line 6, and add the following lines:

--Detailed Description of the Drawings--

--Figure 1 is a block diagram of a network of computers 30 in accordance with the preferred embodiment of the invention. The computers 31, 32, 33, 34 35, 36 are connected in a network 37 using the TCP/IP network protocol. Although there are six computers shown connected to the network in Figure 1, the number of computers in the network need not be a fixed number. Computers in the network may be added or removed as necessary. In the preferred embodiment, each computer in the network need not be of identical manufacture. Each computer in the network may be, for example, a Hewlett-Packard computer running the HPUX 9.x operating system, an IBM PowerPC computer running the AIX 3.2.5 operating system, or a

Sun Microsystems computer running the SunOS 4.1.3 operating system. Note that the operating system on each of the mentioned computer is a version of the well-known UNIX operating system. The versions of the UNIX operating system provide the common software capability that are useful in computer to computer communication. Thus, the computers can communicate with each other regardless of who manufactures the computer. Also, each computer is linked to the network using the TCP/IP protocol, making each computer's hardware connection compatible with the other computers on the network. Therefore, with a common hardware connection and common software in the operating system each computer in the network can communicate with any other computer in the network.

Figure 2 is a flow diagram which illustrates the major steps of a method in accordance with a preferred embodiment of the present invention. A monitor computer 11 is linked to a target computer 12 by means of the network. One of the computer in the network of Figure 1 is designated the monitor computer 11, and any of the other computers on the network will, in turn, become the target computer to be queried. The query sequence between the monitor computer and a particular target computer typically occurs at about 15 minutes intervals during time of heavy business activity such as Monday through Friday, and about one hour intervals during time of light business activity such as a weekend. At a predetermined time monitor computer 11 sends a network verify command in step 23 to a target computer 12. An example of the network verify command which is a UNIX System Command known as a "ping" command is shown below:

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pelican.root 39# /usr/etc/ping monkey
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In the above "ping" command, the identifier of the monitor computer is "pelican" and the identifier of the target

computer is "monkey". The target computer 12 responds to the "ping" command from the monitor computer, if the hardware of the target computer is operational, with a network response in step 13 as follows:

monkey is alive

Typically, network verify command in step 23 and network response in step 13 are low level commands provided as part of the functionality of the computers' UNIX-like operating systems. This response serves to indicate that the network connection between monitor computer 11 and target computer 12 is operational and that the hardware of the target computer is actually running. Next a test of the electronic mail (email) capability of the target computer is performed in step 22 to ensure that email service in the target computer is operational. The email message from the monitor computer to a target computer to determine whether the email capability of the target computer is operational is shown below:

pelican.root 40# telnet monkey 25

Trying 192.1.1.1 ...

Connected to monkey.

Escape character is '^]'.  
  
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The email capability utilized in the monitor computer and the target computers is the Sendmail software package which is standard software in the UNIX-like operating systems of the respective computers. A detail description of the "Sendmail" software is available in the handbook "Sendmail" written by Bryan Costales and published by O'Reilly and Associates. In the above example, the identifier of the monitor computer is "pelican", the identifier of the target computer is "monkey", and the number "25" designates that the Sendmail software is

to be used to send the message. It is important to test the operation of email so that monitor computer 11 does not send multiple messages to a disabled computer. Such a condition causes a large number of messages to be queued for later delivery while waiting for target computer 12 to become operational. These queued messages can cause network congestion and can even delay or inhibit restart of target computer 12 if the volume of queued messages is sufficiently large. Accordingly, if email is not operational, monitor computer 11 sends no more messages but takes the appropriate corrective action such as notifying an operator. If email is operational, an email reply message in step 14 is generated by remote system 12 as shown below:

220 monkey.sps.mot.com Sendmail 4.1/SMI-4.1 ready  
at Tue, 16 May 95 13:03:40 MST

Upon receiving email reply message, step 14, from the target computer 12, monitor computer 11 generates a custom status request message which is sent 21 to target computer 12 by electronic mail as shown below:

From: root@pelican.sps.mot.com (Mr. Pelican)  
To: mbounce@monkey  
Please-Return-To: bouncefile@pelican.sps.mot.com  
Host: monkey

The message from the monitor computer is directed to software module "mbounce" of the target computer as shown above. In this message the designation of "25" for the "Sendmail" software is not necessary since both the Monitor and the target computers are already in email mode. The "mbounce" software module gathers the status of the target computer and formats them into a file for the monitor computer. Receipt of

this special message causes a status program, "mbounce", to be run on target computer 12 to generate a status file in step 16 to be sent to the monitor computer. The monitor computer email message specifies that the status file in step 16 generated by the target computer is to be sent to a file called "bouncefile" of the monitor computer as shown in the third line of the above email message from monitor computer.

An example of a status message in step 16 from the target computer is as follows:

From: daemon@monkey.sps.mot.com  
To: bouncefile@pelican.sps.mot.com  
From root@pelican.sps.mot.com Tue May 16 13:45:20 1995  
Received: by pelican (4.1/SMI-4.1/Email-2.1)  
id AA07088 for mbounce@monkey ; Tue, 16 May 95 13:45:19 MST  
Date: Tue, 16 May 95 13:45:19 MST  
From: root@pelican.sps.mot.com (Mr. Pelican)  
To: mbounce@monkey.sps.mot.com

Please-Return-To: bouncefile@pelican.sps.mot.com

Host: monkey

USER	PID	%CPU	%MEM	SZ	RSS	TT	STAT	START	TIME	COMMAND
daemon	25521	7.7	1.7	44	244	?	S	13:45	0:00	
/usr/local/xlate/bin/mbounce										
root	25517	3.9	3.0	224	432	?	S	13:45	0:00	-AA19446 To az49law1.sps.mot.com (sendmail)
root	2	0.0	0.0	0	0	?	D	08:04	0:02	pagedaemon
root	73	0.0	0.0	16	0	?	I	08:05	0:00	(biод)
root	54	0.0	0.0	56	0	?	IW	08:05	0:03	portmap
root	184	0.0	0.0	56	0	?	IW	08:05	0:00	inetd
root	58	0.0	0.0	40	0	?	IW	08:05	0:00	keyserv
root	431	0.0	0.3	44	44	?	S	08:08	0:17	in.telnetd
root	67	0.0	1.3	132	180	?	S	08:05	1:22	in.routed
root	1	0.0	0.2	52	24	?	S	08:04	0:10	/sbin/init -
root	105	0.0	0.0	84	0	?	IW	08:05	0:00	rpc.lockd
root	74	0.0	0.0	16	0	?	I	08:05	0:00	(biод)
root	75	0.0	0.0	16	0	?	I	08:05	0:00	(biод)
root	76	0.0	0.0	16	0	?	I	08:05	0:00	(biод)
root	87	0.0	0.7	60	104	?	S	08:05	1:13	syslogd
root	99	0.0	0.7	160	100	?	S	08:05	0:27	/usr/lib/sendmail
-bd -q4m										
root	175	0.0	0.0	56	0	?	IW	08:05	0:00	cron
root	187	0.0	0.0	52	0	?	IW	08:05	0:00	/usr/lib/lpd
root	70	0.0	5.5	4468	792	?	S	08:05	6:09	in.named
root	104	0.0	0.0	52	0	?	IW	08:05	0:00	rpc.statd
root	189	0.0	1.5	48	216	?	S	08:05	0:16	rpc.rstatd
root	172	0.0	0.1	12	8	?	S	08:05	1:56	update
daemon	25524	0.0	3.1	216	448	?	R	13:45	0:00	/bin/ps auxwww

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root      196  0.0  0.0   40    0 co IW  08:05  0:00 - cons8 console
(getty)
root     25497  0.0  0.0  212    0 ?  IW  13:44  0:00 -AA25488 To
palm.sps.mot.com (sendmail)
root     25519  0.0  2.6  232  368 ?  S  13:45  0:00 -AA25516 From
pelican.sps.mot.com: DATA (sendmail)
daemon   25520  0.0  0.8   24  108 ?  S  13:45  0:00 sh -c
/usr/local/xlate/bin/mbounce
daemon   25522  0.0  0.8   24  108 ?  S  13:45  0:00 sh -c (/bin/ps
auxwww ; /bin/df) > /tmp/pslog
daemon   25523  0.0  0.6   24   80 ?  S  13:45  0:00 sh -c (/bin/ps
auxwww ; /bin/df) > /tmp/pslog
root      0  0.0  0.0   0    0 ?  D  08:04  0:03 swapper
Filesystem          kbytes   used  avail capacity  Mounted on
/dev/sd3a           14431   4086   8902   31%   /
/dev/sd3g           201043  160908  20031   89%   /usr
/dev/sd3h           359155  124847  198393   39%   /var
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The above status message is returned in step 17 by electronic mail from target computer 12 to monitor computer 11. The status message contains information such as the processes that are running, or scheduled to be run on the target computer and their memory utilization. The monitor computer 11 checks the returned status file in step 16 against a custom list of processes which are expected to be running on remote computer 12 and verifies other desired parameters such as disk space utilization. For instance, each line in the retuened status message having the word "root" denotes a process that is running on the target computer. The last column of each "root" line identifies the name of the process that is running, and is match against a list of processes in the monitor computer for the presence of a process. The lines below the line beginning with the word "Filesystem" indicate the disk utilization in the target computer. The column under "avail" indicates this disk space available in kilobytes. The disk availability is checked to see if it is below 5000. The column under capacity indicates the percentage of disk usage. The percentage of disk usage is checked to determine whether it is over 90%. This information is then saved in a log file. If no urgent error messages are noted then no further action is performed. If required, however, the status is evaluated in